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Ripularia

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1995



Richard Ware Sr.

Ratibida pinnata (Ventenat) Barnhart

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Byliners

James R. (Jim) Allison, of the Natural Heritage Program, Georgia Department of Natural Resources, might be described as a plant detective when he travels the state looking for long-lost or seldom-found species. Sometimes he acts on tips, but he also finds clues in both old and new written records, in the habits of the plants, and in the lay of the land.

David L. Emory and his wife, Sally, in recent years have sallied forth from their home on their very own pond at Palmetto to travel in Chile, New Zealand, and Australia. David's fascination with the flora of faraway places is equaled by his enduring interest in Georgia's.

David Funderburk is administrative coordinator for maintenance and operations at Fernbank Science Center, where he has worked since 1966. He is a biologist, has taught science, writes, gardens (wild flowers), and photographs, and has led ecology trips to the Galapagos Islands and the Amazon jungle of Peru.

Sally Gutzke of Decatur is a clinical social worker and amateur artist who has taken off from her job and is devoting two years to concentrating on art with the hope of maybe becoming a professional at it. She is taking a commercial art course.

Will Griffin of Atlanta, vice president of the Georgia Botanical Society, is a landscape ecologist. One of his major undertakings for Bot Soc: compiling its comments on U.S. Forest Service proposals for managing the Chattahoochee and Oconee National Forests.

Dennis Horn of Tullahoma, Tennessee, works in the engineering department of an Air

Force wind tunnel complex, and goes in for wild flowers on the side. He is a charter member of the Tennessee Native Plant Society and has often gone botanizing with Tom Patrick and Jim Allison. He belongs to the Georgia Botanical Society, too.

Frances Kennedy of Mableton went to college in Connecticut and Arizona; lived in Spain, England, Texas, Arizona, and South Carolina with her Air Force husband; and is now teaching in the biology department at West Georgia College in Carrollton.

Marie Mellinger of Clayton continues to be a very busy naturalist. One of her steady activities is chairing the annual Conservation Fair of the Friends of the Mountains, which is held each March somewhere in—you guessed it—the north Georgia mountains.

Barbara Orisich of Decatur is a professional computer graphics designer and illustrator. She works as a publications and multimedia specialist for the U.S. Fish and Wildlife Service.

Marilyn Worthen Rose, a Marietta artist, is new to the pages of *Tipularia*. She works in watercolor as well as other media and is well-known for her drawings of birds. Among her drawings for note cards are the Carolina wren, the black-capped chickadee, and the black-and-white warbler.

Margaret Shannon lives in a house overlooking a small lake in Gwinnett County, her home before and since retirement from her newspaper job. In her yard is a single-flowered kerria that is the source for plants marketed in some nurseries as *Kerria japonica* "Shannon." She didn't do it; a friend asked for cuttings—and got them.

Continued inside back cover

Membership

The Georgia Botanical Society is open to all persons interested in the botany of Georgia. Annual dues: individual or family, \$20; group, \$25; student, \$5. Send address and check payable to Georgia Botanical Society to Daisy Arrington (see opposite page). Members receive *Tipularia* without extra charge. Persons wishing only to receive the magazine may become *Tipularia* associates for \$10 a year. Single copies, when available, may be ordered from Sally Emory, 7575 Rico Rd., Palmetto, GA 30268; (1991 and before, \$4; 1992 and after, \$10).

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Tipularia strives to combine the scientific authority of a botanical journal with the readability of a magazine. Some articles are assigned; unsolicited manuscripts are welcomed for consideration. *Tipularia* is unable to pay for articles or art, but there is no charge for publication of them.

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Barnhart, the gray-headed prairie coneflower,
photographed by Richard Ware Sr. in
Floyd County

Prairies...in Georgia!

They're for real, as the flora shows

By James R. Allison

Say the word "prairie," and most people think of Kansas, Illinois, anything but Georgia. But there are a few places in northwest Georgia (and northeastern Alabama) which come close enough in their appearance and floristic composition that they may be called just that.

Several terms have been used in the East for open, treeless areas dominated by grasses and other herbs. Among those most in use in the Southeast today are "glades," "barrens," and "savannas," and there has been much argument over the proper use of these terms (see *Castanea* 59:184-254 for an interesting discussion of this nomenclatural problem).

If the term "prairie" is restricted to the classic natural community of the Midwest, the areas which are the subject of this discussion would probably best be called "barrens," as they meet the criteria for such designation found in some of the literature (e.g., Baskin et al., 1994. *Castanea* 59:226-254). "Barrens" is

little used in Georgia, except for the pine barrens of south Georgia. Where they still exist, the pine barrens are similar to the prairies of northwest Georgia in being open, sparsely forested places, maintained in that condition by periodic wildfire. Their plant life is quite different, however, because the pine barrens community developed upon a more acid soil.

I have chosen to refer to the northwest Georgia barrens, thus far known to persist only in Floyd County, as prairies, with the understanding that the term is loosely applied. Why use an ugly word like "barrens" for places that have plants with names like prairie dock, prairie mimosa, prairie dropseed, and prairie coneflower? And besides, the dominant grasses of the Tallgrass Prairie are all important components of the Georgia prairie flora—namely, big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), Indian grass (*Sorghastrum nutans*), and little blue stem (*Schizachyrium scoparium*).

Character

Like the prairies of the Midwest, those of Floyd County are naturally open spaces developed on clayey, calcareous soil and dominated by specially adapted grasses and other herbaceous plants, with occasional shrubs and scattered, stunted trees. It must be admitted, however, that they differ from the “true” prairies in several respects.

At the time of European contact, the midwestern prairie existed as essentially unbroken areas of up to many hundreds of square miles each. At that same time, the outliers in northwest Georgia probably never occupied more than several tens of acres. Also, as you would expect, the flora of the Georgia prairies is somewhat different, with a number of the more western elements lacking and suitably adapted eastern species taking their places.

Development

Our eastern outliers of prairie habitat also developed in and persisted with a different set of conditions. The midwestern prairie developed over an area with a drier climate than that of the Southeast, the lower rainfall there favoring herbaceous vegetation over tree growth. And after a dry spell, lightning-caused wildfire could run unchecked over immense areas, periodically clearing them of woody invaders except along watercourses.

The eastern prairie outliers developed in areas where (1) the land is relatively flat and (2) fine-grained limestone or calcareous shale is near the surface and has weathered to form

a soil of sticky, calcareous clay. This soil, of the Conasauga (or perhaps sometimes Firestone) series, like the soils of the midwestern prairies, is high in calcium, a nutrient that is essential to plant growth but inhibits the uptake of other minerals when present in high concentration. The chemical composition of the soil was thus a limiting factor for the potential vegetation.



Silphium terebinthinaceum, *prairie dock*

James R. Allison

The heavy, clayey soil texture is another limiting factor. Such a soil is capable of holding moisture for a longer time than a coarser, loamier soil. However, where the topography is level, that can be too much of a good thing, for such a soil often remains too wet in winter and early spring for the growth of many plants. Because these soils are shallow and the lack of tree cover provides little shade, they are also subject to



Marshallia mohrii, Mohr's Barbara's-buttons

becoming extremely dry in the summer and fall.

Thus, the prairie communities of the East have developed where conditions of soil and topography have fostered the growth of plants tolerant both of high calcium levels and of lengthy periods of saturation followed in many years by long periods of extreme drought.

Maintenance

Surely over time, the decay of plant material in these places would be expected to add humus to the soil, deepening it and loosening it to the point where shrubs and then trees would invade the area and the prairie community gradually disappear. In fact, our prairies are surely mere remnants of an ecosystem that once occupied a considerably larger area. The prairies probably attained their greatest extent (in comparatively recent geological time) during the so-called Holocene Hypsithermal, from about 9,000 until 4,000 years ago.

Several studies of pollen found in sediments dating to that time

indicate a paleoflora over much of the eastern United States that was adapted to warmer and drier conditions than prevail today. This paleoclimate was much more conducive to the development of grasslands, and prairie-like areas were extensive enough to support herds of large herbivores

such as the wood bison.

With the eventual cooling of the climate and higher rainfall, these areas must have undergone considerable contraction, maintaining themselves to the present time only where (1) factors of soil and topography were conducive and (2) where fire, either natural or man-induced, occurred with sufficient frequency to constrain encroachment by woody plants.

History

These prairie communities have gone unrecognized in Georgia until quite recently, and they are not to be found in that wonderful book, *The Natural Environments of Georgia*, by Charles Wharton. In retrospect, clues to their past existence could be found along roadsides and under power lines in places where the soil was suitable. In such places, where prairie-like conditions were artificially maintained, people had seen (and botanists collected) species with definite prairie affinities, like prairie dock and pale coneflower.

Our natural, fully developed prairie areas awaited discovery until 1991. In that year, as part of my job with the Georgia Department of Natural Resources, Natural Heritage Program, with funding from the U.S. Fish and Wildlife Service, I began a search for nationally threatened Mohr's Barbara's-buttons (*Marshallia mohrii*) in Georgia.

There had been a dubious report from Walker County, but otherwise it was unknown from the state. However, it had been found a few years earlier on a roadside less than a mile from the Georgia line, in Cherokee County, Alabama, suggesting good prospects for finding it in Georgia.

Success came on June 4, 1991, when I found the plant in a remarkable, prairie-like area in Floyd County, north of the Coosa River, not far from the Alabama locality mentioned above. The topographic map showed a small, white blotch within a larger green area, indicating an opening within forest land. Most often such a blotch turns out to be a small pasture or field, but this time—yes, a natural clearing, full of prairie dock (*Silphium terebinthinaceum*) and a good bit of the Barbara's-buttons. Since that time, relying on topographic maps and aerial photography, I have found the plant at more than a dozen places in Floyd County, some of them roadsides or power line rights-of-way, but several of them additional prairie areas.

Flora

Each of the prairies has its own unique assemblage of plants, but they are marked by large numbers of species in common. These include many that are broadly enough

adapted that they may also be found on roadsides, where they either have spread or have been able to persist because the road shoulders have been maintained in an open condition.

Among the most striking and characteristic of these plants is prairie dock, with very large, simple leaves and a tall, leafless flower stalk bearing heads of yellow flowers in the late summer. Earlier to flower, and perhaps less striking but perhaps more beautiful to most people, are the pale coneflower (*Echinacea pallida*) with light pink, drooping ray flowers, and Mohr's Barbara's-buttons, with similarly colored flowers but of a form more like bachelor's buttons (*Centaurea cyanus*). Space does not permit me to discuss each of these interesting prairie species individually. You must see them for yourself, perhaps on a future Georgia Botanical Society field trip.

Other prairie species that can be found on roadsides, most of them rare if found at all in Georgia outside the prairie area, include nodding onion (*Allium cernuum*), green milkweed (*Asclepias viridis*), prairie milkweed (*Asclepias hirtella*), two grass-leaved asters (*Aster laevis* var. *concinus* and *Aster paludosus* var. *hemisphericus*), New England aster (*Aster novae-angliae*), blue wild-indigo (*Baptisia australis*), the rare swamp thistle (*Cirsium muticum*), prairie mimosa (*Desmanthus illinoensis*), tall thoroughwort (*Eupatorium altissimum*), velvet-leaved sunflower (*Helianthus mollis*), Canada bluets (*Houstonia canadensis*), blazing stars (*Liatris aspera*, *L. spicata*, and *L. squarrosa* var. *hirsuta*), a narrow-leaved loosestrife (*Lysimachia quadriflora*), Boykin's milkwort

(*Polygala boykinii*), prairie coneflower (*Ratibida pinnata*), glade wild petunia (*Ruellia humilis*), a white-flowered goldenrod (*Solidago ptarmicoides*), stiff goldenrod (*S. rigida*), glade verbena (*Verbena simplex*), and in low, moist places, lace-pixies (*Leucospora multifida*) and prairie rush (*Juncus filipendulus*).

Individual Sites

As indicated above, each of the prairies has a unique assemblage of plants. The site I call the Dry Prairie is on a hillside, and unusually xeric,

as the name implies. It is apparently too dry for the Barbara's-buttons, yet has at least a few species in common with the other extreme, a site I call the Wet Prairie. Chief among these is round-fruited St. John's-wort (*Hypericum sphaerocarpum*), known otherwise in Georgia from a single population in Dade County. The Dry Prairie also boasts a small population of a state-protected orchid, the Great Plains ladies-tresses (*Spiranthes magnicamporum*), until last October believed to be found in Georgia only on the cedar glades of Catoosa County. Additional noteworthy

Echinacea pallida, pale coneflower



Schoenolirion croceum, sunnybell



Dennis Horn

Leo T. Barber Jr.

species found at the Dry Prairie are a genuine prairie grass, side-oats grama (*Bouteloua curtipendula*), Craue's sedge (*Carex crawei*), blue wild-indigo, Virginia false gromwell (*Onosmodium virginianum*), and Mexican plum (*Prunus mexicana*).

Another rather dry site is the latest prairie to be discovered. Since I've only seen it in mid-October (1995), I can't be sure how many of the rarities may be there, but it definitely has side-oats grama, Virginia false gromwell, and the largest known Georgia population of Great Plains ladies-tresses. I haven't yet decided between two names for this prairie: Ladies-tresses Prairie, or, in recognition of the violet that appears to be extraordinarily abundant there, Bird's-foot Prairie.

Nearly as dry as these two places is the Grand Prairie, the largest of the Floyd County prairies. Besides having Mohr's Barbara's-buttons, the false gromwell, and side-oats grama, this site boasts two varieties of a blazing star, *Liatris squarrosa* var. *squarrosa* and the rarer var. *hirsuta*. The two varieties remain distinct by staggering their flowering periods, reducing the likelihood of hybridization.

Sunnybell Prairie is named for its large population of sunnybells (*Schoenolirion croceum*), a yellow-flowered member of the lily family. The moister conditions at this site permit still other rarities to grow, including Carolina joint-tail (*Coelorachis cylindrica*), greater mock bishopweed (*Ptilmnum costatum*), and Thorne's beaksedge (*Rhynchospora thornei*), a candidate for listing under the Endangered Species Act.

But the most remarkable and the richest botanically of these places is the Wet Prairie. This boggy site is home to at least ten rare species, one of them among the rarest plants in the United States. Besides having Thorne's beaksedge, New England aster, Mohr's Barbara's-buttons, round-fruited St. John's-wort, mock bishop-weed, and swamp thistle, it supports other rarities, such as few-headed ragwort (*Senecio pauperculus*), prairie dropseed (*Sporobolus heterolepis*; probably the state's best population), and Virginia horse-mint (*Pycnanthemum virginianum*).

But its preeminent distinction is that it is home to the only known population, anywhere, of the whorled sunflower (*Helianthus verticillatus*). This plant is worthy of an article to itself; suffice it to say here that it had been collected only once before, over a century ago, in Chester County, Tennessee, and never seen again until 1994.

Conservation Needs

What needs to be done to preserve these rare and botanically rich prairie communities? Evidence that fire played a crucial role in maintaining barrens in the East is found in the accounts of early settlers, who noted that such places grew up in trees unless they were burned. They also recounted the use of fire by Native Americans to drive game and maintain habitat for grazing animals. European settlement resulted in a tremendous decline in these places, either directly, through conversion to cropland or residential areas, or indirectly, through the suppression of wildfire.



Spiranthes magnicamporum,
Great Plains ladies-tresses

Today Georgians are left with a few tiny, token remnants of prairie, in danger of disappearing altogether in the future if they are not resuscitated by adoption of controlled burning. How many species have already been lost from the flora no one can say. But the story of the whorled sunflower suggests that some may have already become extinct, not just in Georgia, but in totality. These sites need to be protected or future generations will be denied any opportunity to experience these remarkable and beautiful places.

Acknowledgement

I have shared the locations of these prairies with a most talented and enthusiastic amateur botanist, a resident of Floyd County, Richard Ware. Visiting the prairies later in the season than I did during my searches for Mohr's Barbara's-buttons, he is responsible for discovering several of the late-summer and fall-blooming rarities discussed above—New England aster, swamp thistle, greater mock bishopweed, and whorled sunflower.

The Liverpudlian Who Left Home

The man who first described *Echinacea pallade*, the pale coneflower, was born in 1786 in Settle, Yorkshire, England, and studied in his uncle's shop in Liverpool to be a printer. By his mid-30s, however, this Liverpudlian, Thomas Nuttall, had written *The Genera of North American Plants, and a Catalogue of the Species, to the Year 1817* and had become curator of the Harvard botanical gardens.

Nuttall's career as a botanist (and ornithologist) began as a spare-time pursuit in England and after his emigration to America in 1808 was encouraged by Benjamin Smith Barton, the great Philadelphia naturalist and mentor to many. Nuttall traveled into the far reaches of the United States and into Canada. Some of the areas had never been seen before by a botanist.

Among his numerous discoveries besides the pale coneflower are: *Silene rotundifolia*, a fire pink; *Oenothera speciosa*, the showy evening-primrose; *Gratiola floridana*, the Florida gratiola; *Lindernia monticola*, a false pimpernel; *Coreopsis nudata*, the swamp coreopsis; *Cacalia lanceolata*, Indian-plantain; and *Sparganium americanum*, bur-reed. The crane-fly orchid, first described by Henry Muhlenberg in 1813 and renamed by Frederick Pursh in 1814, was given its present designation by Nuttall in 1818: *Tipularia discolor*.

Nuttall inherited his uncle's estate, "Nutgrove," near Liverpool, in 1842 and returned to England. He died at "Nutgrove" in 1859 at the age of 73.

First Person Singular: Floyd Flora

Variety is the spice of botanizing

By Richard Ware Sr.

The flora of Floyd County is probably one of the most varied of any Georgia county. I'm not sure of the reason. I think it's because, while Floyd is in the Ridge and Valley Province, it is also close to the Cumberland Plateau, the Blue Ridge, and the Piedmont. Also, many Coastal Plain species have migrated up the Coosa River.

Floyd County Flora is the name of a database program on my computer cataloging the plants that grow here. All my spare time in 1993 was spent studying the plants of Whitmore's

Bluff, a series of three limestone bluffs north of Rome on the east side of the Oostanaula River. In 1994, I was in western Floyd County studying the various prairie areas discovered earlier by Jim Allison (see article in this issue).

To form my database, I combined these two plant lists with other lists I had made from other locations in the county, such as Black's Bluff. Then I went to the University of Georgia Atlas and merged the plants I have seen in Floyd County with specimens listed as already on file in the

university herbarium. The total so far is 957 species. In 1995, I spent some time trying to collect the 200-plus species that grow in the county, but which haven't been collected for the herbarium.

For me, the most exciting part of these studies has been my discovery of several new state record plants. I also have collected others that have been known or reported from Georgia before, but haven't been found or collected in recent years.

The first of my discoveries in the new state category is whorled sunflower (*Helianthus*

Helianthus verticillatus, whorled sunflower



Richard Ware Sr.

verticillatus). I found this growing in one of the prairies that Jim Allison has dubbed the Wet Prairie. I also spotted it next to Jefferson Road, the dirt road leading to most of the prairie sites.

In 1995, I found a beautiful milkweed growing alongside Technology Parkway about two miles from my house in Rome. I collected a specimen, and later identified it as purple milkweed (*Asclepias purpurascens*). Tom Patrick of the Natural Heritage Program, Georgia Department of Natural Resources, confirmed my identification, but said there was a historical collection from Pine Mountain in the Valdosta State College herbarium. However, Dr. Richard Carter has confirmed that the specimen at Valdosta State had been mislabeled and was not *Asclepias purpurascens*. I later found a much larger population of this plant on Old Summerville

Road north of Rome.

Later in 1995, I sent Jim and Tom a specimen of shingle oak (*Quercus imbricaria*) collected on Sand Springs Road in Floyd County—hopefully another record. I have been seeing this tree in Floyd for as long as I can remember. There are several specimens near my Floyd County home in Garden Lakes and in Myrtle Hill Cemetery.

In the category of plants with valid historical records, or reputed to have been found in Georgia by botanical authors, we have lion's foot (*Prenanthes barbata*) growing on the prairies and in my backyard and a beautiful purple aster (*Aster novae-angliae*) growing in the prairies.

Some of the other interesting plants I've encountered during the last three years are:

Asplenium rhizophyllum, walking fern

Pachysandra procumbens, Allegheny spurge
Dodecatheon meadia, shooting star

Phyla lanceolata, fog fruit

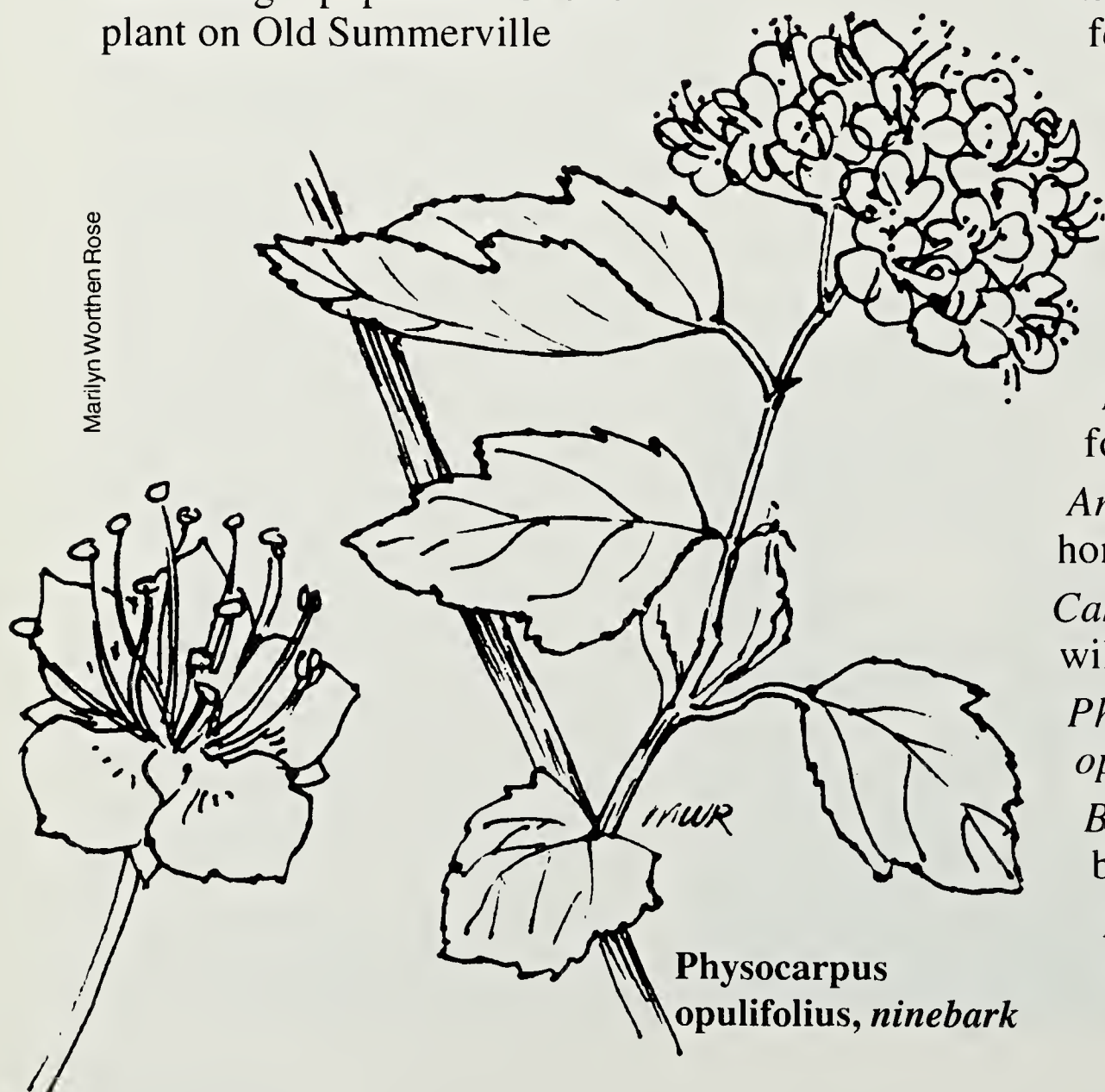
Ampelamus albidus, honey vine

Camassia scilloides, wild hyacinth

Physocarpus opulifolius, ninebark

Baptisia australis, blue false indigo

Panax quinquefolius, ginseng



Physocarpus opulifolius, ninebark

Marilyn Worthen Rose



***Camassia scilloides*,
wild hyacinth**

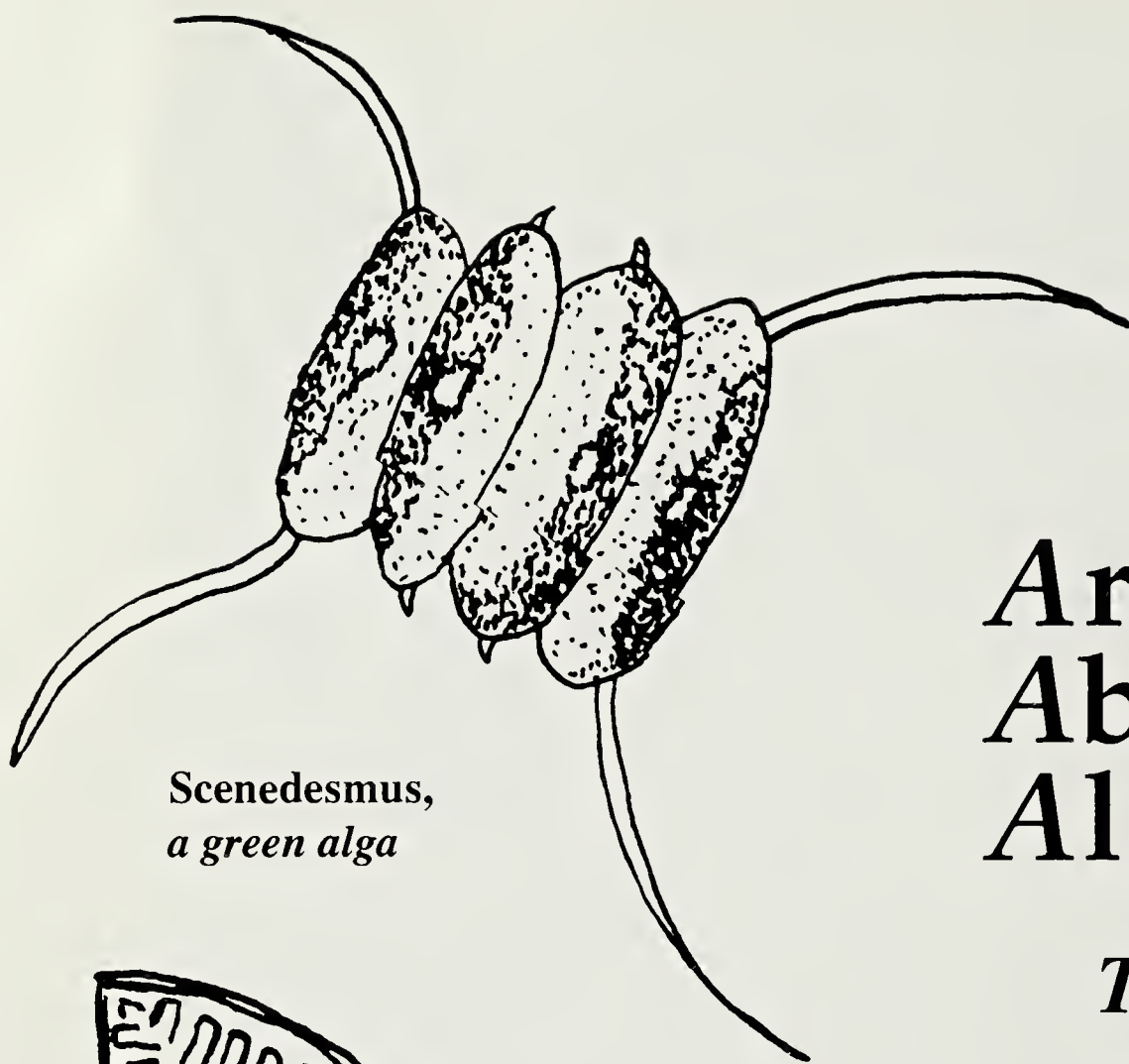


***Veronicastrum virginicum*,
Culver's root**

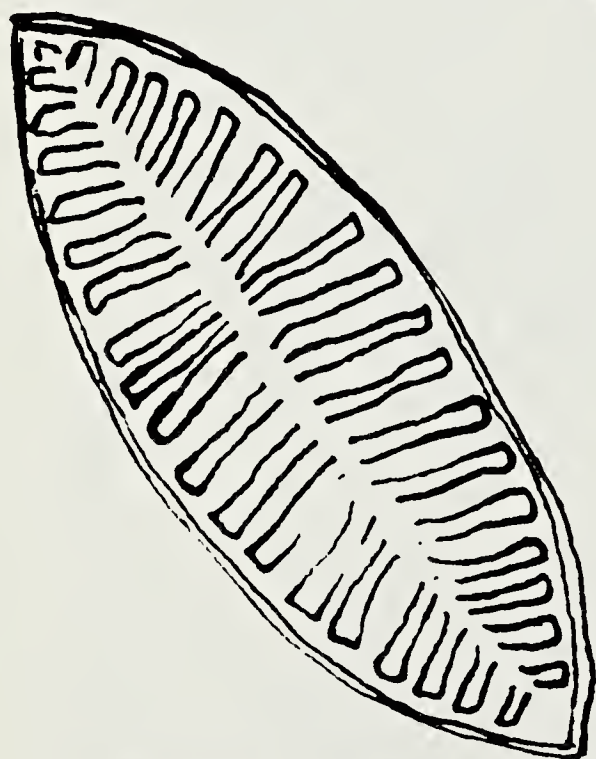
Marilyn Worthen Rose

Triosteum angustifolium,
horse gentian
Plantago cordata, plantain
Schoenolirion croceum, sunnybell
Baptisia alba, white baptisia
Lysimachia quadriflora, prairie
loosestrife
Veronicastrum virginicum,
Culver's root
Sida elliotii, mallow
Ptilimnium costatum, bishop's weed
Physostegia virginiana,
obedient plant

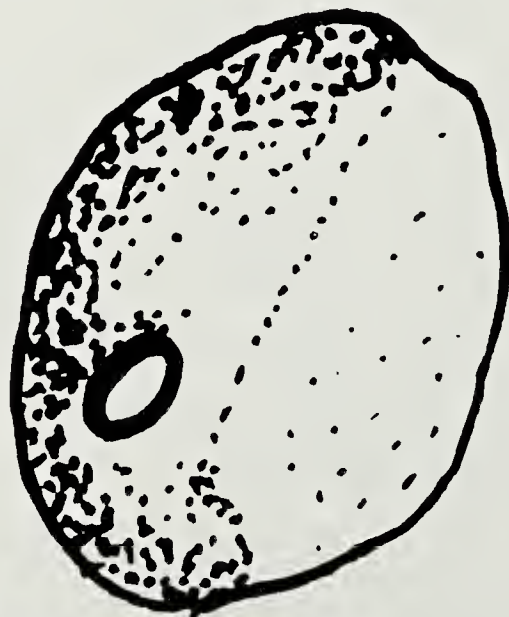
Mosla dianthera
Cirsium muticum, thistle
Lilium canadense, Canada lily
Sabatia capitata, upland sabatia
Ruellia humilis, wild petunia
Ambrosia bidentata, prairie ragweed
Aureolaria patula, false foxglove
Leucospora multifida
Euthamia leptcephala,
flat-topped aster
Scutellaria nervosa, veined skullcap
Scutellaria montana, large-flowered
skullcap



Scenedesmus,
a green alga



Surirella, *a diatom*



Chlorella,
single-celled, green

Around & About with Algae

*They lead a
colorful life
of slime*

By Frances Kennedy

The algae are an eclectic group of organisms that may be found in water, soil, and air and even within other organisms. They come in different colors, shapes, and sizes. Algae are variously claimed and studied by microbiologists, zoologists, and botanists.

So, what is it that joins organisms together under the heading of algae? The answer is: not a great deal. All groups of algae contain chlorophyll and generate oxygen. Unlike higher plants, algal reproductive cells are naked; they are not surrounded by a series of sterile cells. Nor do these organisms produce embryos (1,2). Despite a few similarities, most algae

Drawings by Frances Kennedy

are generally recognized as such once a person has a passing acquaintance with the various body types found in the different groups.

Algae have a world-wide distribution. Some species are found living in

permanent snow fields where they actually stain the snow such colors as pink, orange, or green. Other species are found at the opposite end of the temperature

spectrum living in hot springs at temperatures of 35–40 degrees Centigrade.

The algae most familiar to us are those that we generally see as long, green, hairlike growths in freshwater ponds, in streams, or near waterfalls. Most of us have probably slipped on rocks made slippery by algal growth. These algae appear as dark brown or almost black discolorations on the rocks. Most often they are diatoms or blue-green algae or some combinations of these groups. There are also a few species of red algae that grow in fresh water and contribute to the flora of the rocks on which they form little tufts. I have found specimens of fresh-water red algae growing in a little stream in Thompson Park, near the Veterans Administration Hospital in Decatur, Georgia.

Soils also are home to a variety of algal species. Several of the blue-green algae (*Cyanobacteria*) are able to fix atmospheric nitrogen. These species help to enrich the soil around them. However, the roles of many

soil algae are not well understood. Why do certain of the green algae live in soil where they would not seem to be exposed to sunlight very much, if at all?

Fungi and algae form symbiotic

relationships which we know as lichens. Until fairly recently, it was not possible to grow either the fungus or the alga from a lichen if the other member of the association was

not present. Now scientists have done a number of nutritional studies that have allowed each of the two organisms to be grown in a culture without the presence of the partner organism. This research affirms that the lichen partnership is a sharing, with each organism benefiting from association with its partner.

Species Grouping

One of the most noticeable characteristics of the alga is the color of the plant body. There are algae that are obviously green or brown or red in color. There are even algae that are blue-green or purple. In early descriptions of algae, they were indeed grouped by their general color. Even today several of the major groups of algae carry the common names of red, green, brown, blue-green, or golden-brown in reference to their basic color.

Taxonomic characterization of such a diverse group of organisms can be a bit tricky. This is reflected in the many different taxonomic schemes which have been proposed

...research affirms that the lichen partnership is a sharing, with each organism benefiting from association with its partner.



Postelsia

over the years. With the advent of electron microscopy and DNA sequencing techniques, investigators are comparing many

subtle features and biochemical similarities and differences when considering classification. Most of us will still group these organisms by color and other morphological similarities, at least for the foreseeable future. One can certainly admire these beautiful organisms without being concerned with their family history.

Algal body structure ranges from simple, single, non-motile cells, such as those seen in *Chlorella*, to very elaborate structures which may be up to 150 feet long. These algae have a more complex organization. A number of species give the appearance of higher plants since they have a root-like structure called

the "holdfast," a stem called a "stipe," and a large leaf-like structure, the blade.

One species, *Postelsia*, a brown alga seen off the coast of Oregon, has the appearance of a miniature palm tree. *Postelsia* is found growing along the rocky coastal areas and is exposed at low tide level rather than at the turn of the high tide, the level at which the rockweeds and bladder wrack grow (*Fucus*, *Ascophyllum*).

The coarser-appearing brown algae are resistant to dessication when exposed to air and are especially well-known from the kelp beds found off the Pacific coast of the United States. *Macrocystis* is one of the kelps found in abundance there. These kelp beds are so large that they are commercially harvested by special ships. Products such as iodine and potash are extracted from the harvest (3).

Several of the marine red algae (*Porphyra*) are also grown commercially for food, food additives, medicines, and agar, which is a solidifying agent which revolutionized the field of microbiology. In the late 1800s, Frau Hesse suggested its use to her husband, Walter, an associate of Robert Koch. Koch developed agar for use in culture media (4). Agar will liquefy when boiled and will solidify between 40 and 50 degrees Centigrade. This allowed bacteria to be cultured at temperatures which correspond to body temperature.

Algal extracts are very often used to emulsify foods such as chocolate milk and to give a creamy texture to cottage cheese, ice cream, and similar foods. Look for the terms *carrageenan*, *alginates*, or *alginic*

acid on your next carton of chocolate milk. We even brush our teeth with the aid of algal polishes. Single-celled algae, called diatoms, have a cell wall encrusted with silica. When these organisms die, they leave behind their "glass houses."

These shells are the major component of diatomaceous earth. There are large deposits of diatomaceous earth at several locations in the United States, the largest being in Lompoc, California. These deposits are about 225 meters thick. This material is excellent for fine-polishing surfaces without scratching. However, it is primarily used for filters or filter aids. It is particularly useful as a filtering agent because it does not react chemically and it does not readily compact. Therefore, the filters do not clog easily.

Phenomena

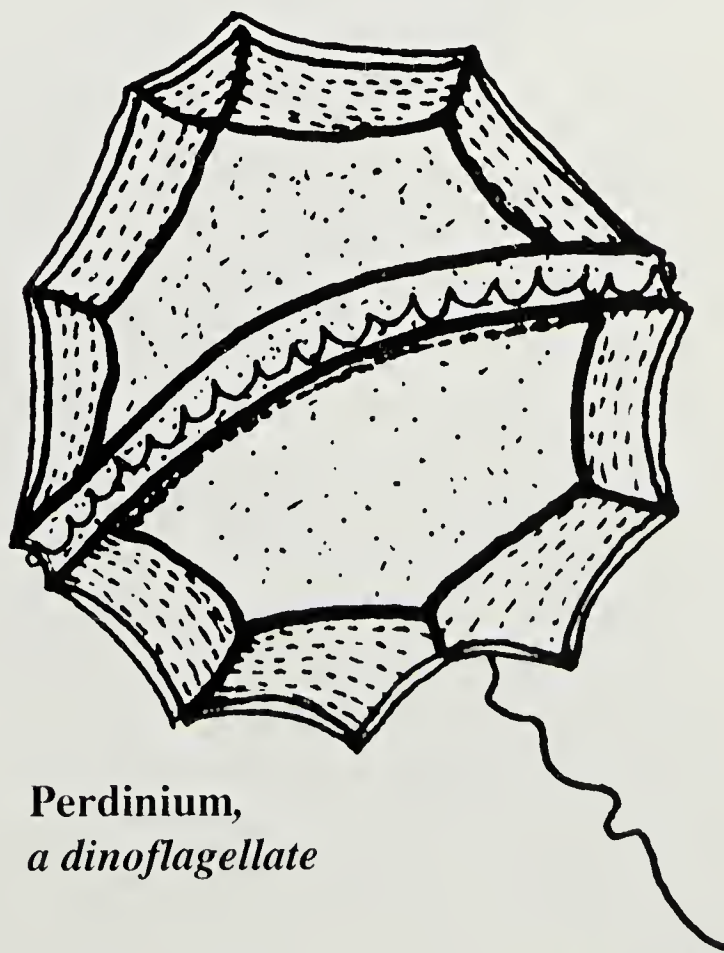
We generally think of the algae as aquatic organisms found in ponds, rivers, and streams and along seacoasts. Phytoplankton (floating algal species) and epiphytes are usually small single cells that cannot be seen with the unaided eye. When millions are present at the same time, however, we are able to see them. This happens, for example, when there is a sudden buildup of a dinoflagellate population along the coast. The "red tide" produced by these great numbers of organisms causes problems for fishermen and can be life-threatening to the unwary.

Species such as *Ceratium*, *Gonyaulax*, and *Gymnodinium*, among others, make up the population causing this phenomenon. Certain of these species contain a

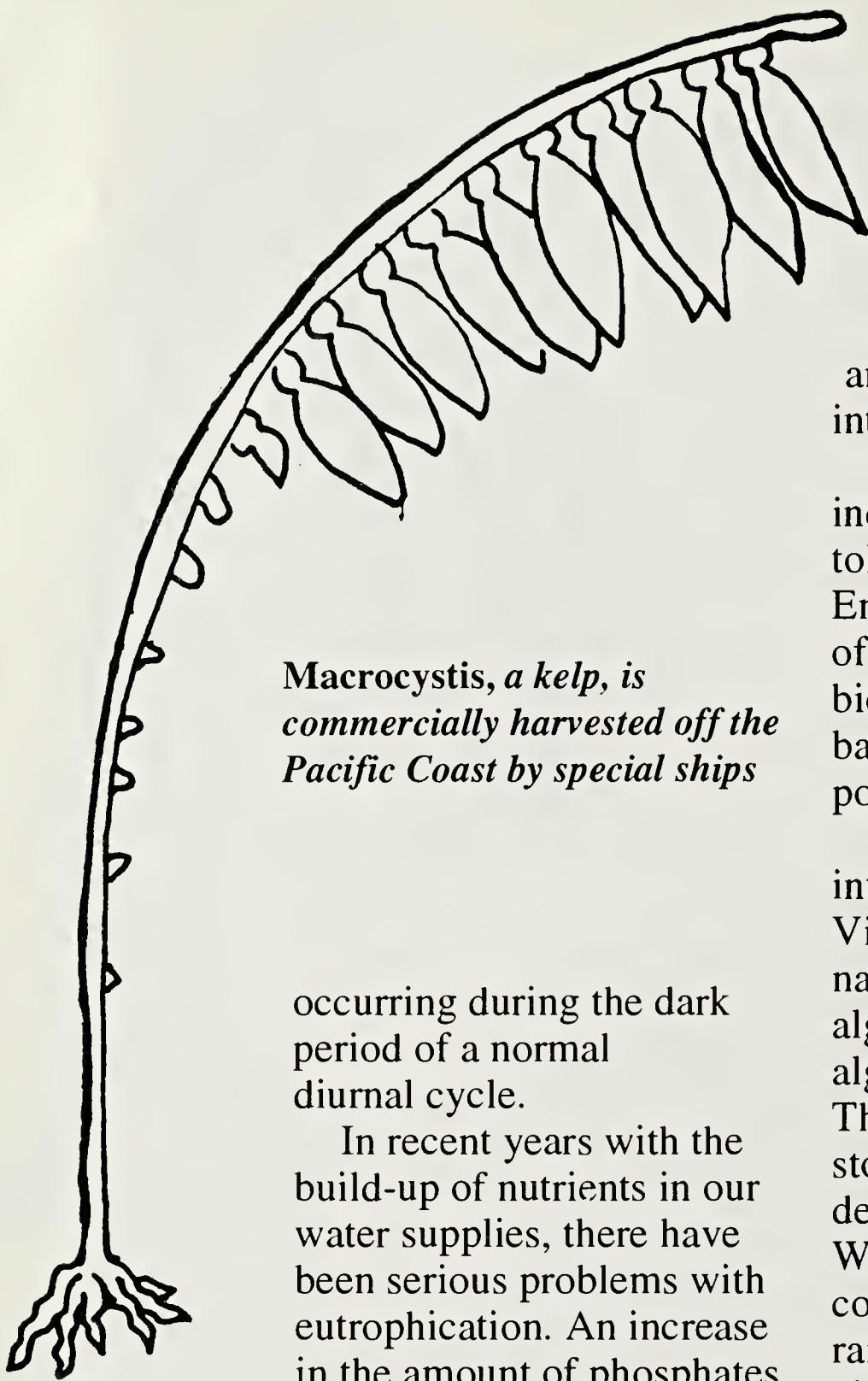
powerful toxin that causes nerve damage and even death if ingested.

Shellfish are filter feeders and, in the process of feeding, ingest a great many dinoflagellates. The shellfish are immune to the toxin, but it accumulates in the siphons and digestive glands of mussels, clams, oysters, and other like animals. This accumulation causes paralytic shellfish poisoning (PSP) in humans who eat the contaminated shellfish. This neurotoxin is 100,000 times more potent than cocaine. PSP is caused by the genus *Gonyaulax*. Other dinoflagellate species produce toxins that will kill fish but that do not affect other vertebrates.

Some species of dinoflagellates are also responsible for the bioluminescence seen in some areas of the world. Research has shown that there is a periodicity to this luminescence. A build-up of luciferin and luciferase (the system responsible for the light flashes of fireflies) follows a rhythm, with peak build-up and subsequent luminescence



Perdinium,
a dinoflagellate



Macrocystis, a kelp, is commercially harvested off the Pacific Coast by special ships

occurring during the dark period of a normal diurnal cycle.

In recent years with the build-up of nutrients in our water supplies, there have been serious problems with eutrophication. An increase in the amount of phosphates and nitrates in the water has caused large algal blooms to occur. The algae have a rather short life cycle; then they die off and begin to decay. The bacteria that eat this large mass of decaying material create a great oxygen demand on the water supply which often results in the suffocation of fish. Death of the fish and other oxygen-requiring organisms in the water supply compounds the problem.

Fortunately there have been steps taken to help prevent this, such as taking phosphate additives out of household detergents and the developing of better wastewater

treatment methods prior to allowing effluent to enter streams and rivers, releasing nutrients back into the water system.

Certain species of algae are indicators of clean water. Others can tolerate rather nutrient-rich water. Environmental tracking of pollution of water sources utilizes these bioindicator species as well as bacterial counts to determine pollution levels.

There also have been some interesting decorative uses for algae. Victorians took advantage of the naturally occurring gels in the marine algae and used them to compose algae pictures, cards, and bookmarks. They simply soaked a good paper stock in seawater and floated out the desired composition above the paper. When the picture was suitably composed, the paper was carefully raised and the excess water was allowed to drain off the algae and paper. This composition was then pressed and left to dry for several days. When the paper press was opened, the decorated paper was ready for use. More recently algae have been mounted in acrylic and used as coasters and trays—more durable, but less charming.

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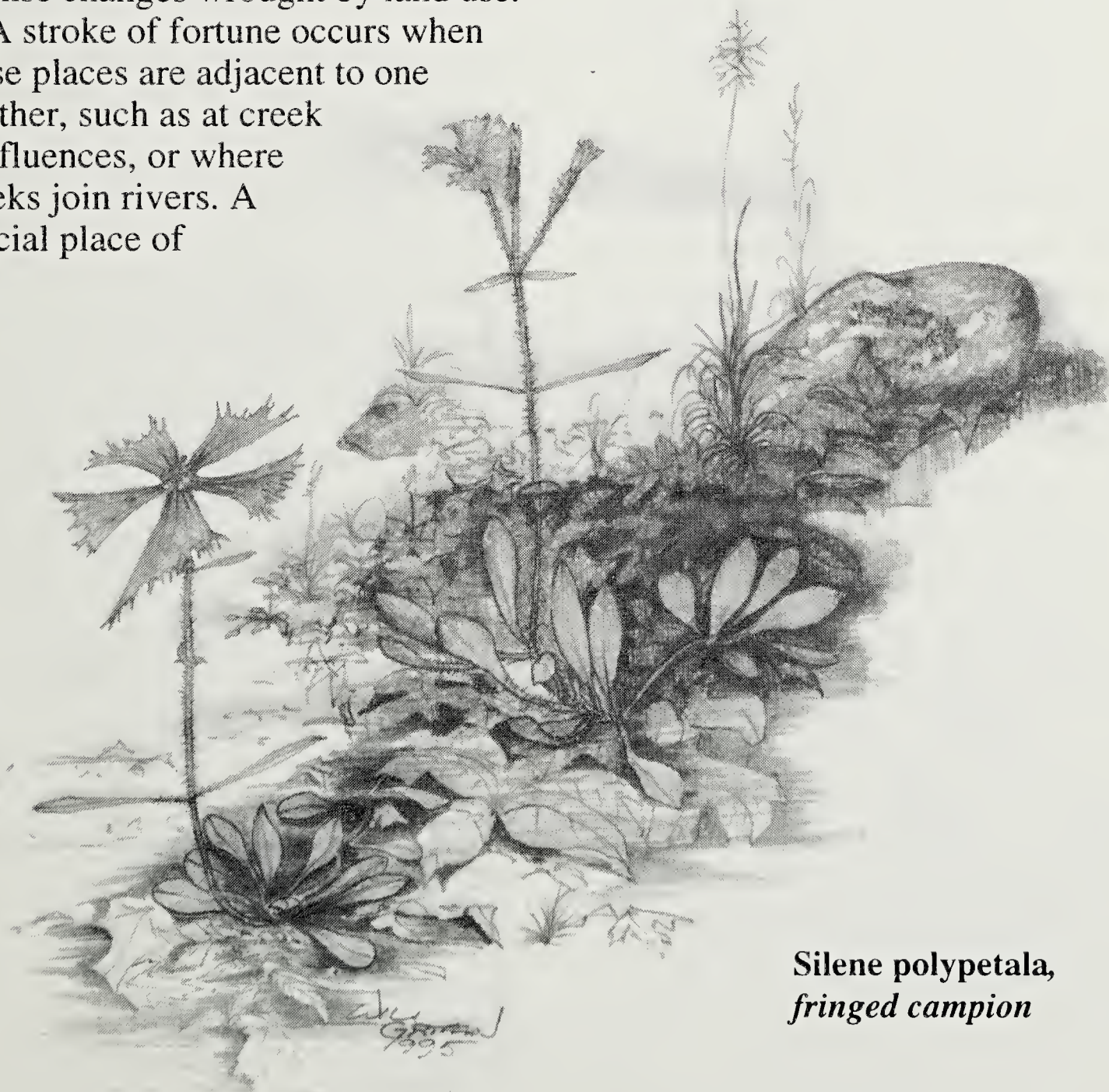
Site-seeing: *Flint Bluffs*

By Will Griffin

As time goes on, I believe I am becoming a lover of slopes and bluffs. Consistently they seem to hold botanical promise. Boundaries and corners of property are nice, too, but slopes and bluffs are outstanding. Like the fence lines of the prairie Midwest, steep woods often offer a rare experience for nature lovers. Scattered in splinters and fragments at the edges of property, agricultural areas, and watercourses, bluffs and steep slopes have often escaped the intense changes wrought by land use.

A stroke of fortune occurs when these places are adjacent to one another, such as at creek confluences, or where creeks join rivers. A special place of

this type occurs in south Upson County, where two small creeks meet the Flint River. Here, as the land slopes toward the river, streams pick up speed and meet one another, soils erode mineral deposits, and the slopes and bluffs bear a resemblance to a rich floristic assemblage which was historically present in the Piedmont woodlands.



Silene polypetala,
fringed campion



Erythronium americanum,
trout lily

Sally Gutzke

The site occurs near U.S. highway 19 as it crosses the Flint River into Taylor County. The river drops quickly down to the Coastal Plain at this location. Over time the forces that have shaped the river and the lower Piedmont have eroded and exposed geologic strata that dominate local soil formation. The resulting soils found on the slopes of the bluffs and hillsides are often mineral rich and distinctive in their circumneutral or base pH. Often the parent rock source can be found at the surface, where it is freely breaking down and associating with the organic components of the soil.

This process seems to be an integral part of the nature of the plant community at this location, a part which warrants study. At the very least, the eroding wash areas form a crystalline substrate which provides a home for outstanding displays of shooting star (*Dodecatheon meadia*) and Easter lily (*Zephyranthes atamasco*) which in some areas appear as a solid carpet of brilliant white for a great distance, interspersed occasionally by dwarf

palmetto (*Sabal minor*), red buckeye (*Aesculus pavia*), and drifts of trout lily (*Erythronium americanum*). Yellow star flower (*Hypoxis hirsuta*) and the curious adder's tongue (*Ophioglossum vulgatum*) can also be found in these areas, somewhat buried after the ferocious flooding and soil deposition of the flood of July 1994.

Walking through the site, I cross one ephemeral drainage after another, as they all head downhill to connect in a bottomland. Typically enough, the tops of the hills are often difficult to negotiate, being full of aggressive young plants colonizing in thickets after heavy disturbance. It is easier walking and infinitely more interesting botanizing to remain on the sides of the hills.

As I return to visit this land every few weeks during the growing season, I see more things flowering in succession on every visit. *Collinsonia tuberosa*, green-and-gold (*Chrysogonum virginianum*), windflower (*Thalictrum thalictroides*), *Trillium cuneatum*, *Geranium maculatum*, *Hepatica*

americana, numerous violets, lyre-leaved sage (*Salvia lyrata*), *Houstonia caerulea*, spiderflower (*Tradescantia rosea*), bellwort (*Uvularia perfoliata*), bloodroot (*Sanguinaria canadensis*), alumroot (*Heuchera americana*), giant chickweed (*Stellaria pubera*), false garlic (*Allium bivalve*), *Vicia caroliniana*, and *Oxalis violacea* cover the slopes in the woodlands.

The woods are dominated by the lively texture of shagbark hickory (*Carya ovata*), *Hypericum prolificum*, and the color of red buckeye. One ravine contains extensive numbers of *Hydrangea quercifolia* and *Rhododendron canescens*, and a small group of coral honeysuckle (*Lonicera sempervirens*), located along a disturbed edge. With remarkable consistency the fringed campion (*Silene polypetala*) is scattered throughout the site on the slopes, providing a wonderful late spring display throughout the area. In isolated locations I have found small populations of the relict trillium (*Trillium reliquum*) and the barren strawberry (*Waldsteinia lobata*).

Another remarkably consistent occurrence throughout the drainage ways on this land is that of old rusty stills. The landowner tells me that at one time the area was anecdotally known as "Still Creek." Thankfully, no beverage distribution warehouses have been built in the ravines.

The landowner has been exceptionally generous about allowing visits into his backyard, and has exhibited a commendable

conservation ethic, heartened by the fact that a few small herbs have saved him from the loss of his woods to a proposed highway alignment. "Not in My Backyard" would literally apply to this man, who gratefully enjoys the blooms of the federally protected fringed campion among the brilliant display of wild flowers every spring in his woods. He wanted land for turkey hunting and bought the steep, oaky woods which "no one else wanted," unwittingly becoming the steward of a fine fragment of Flint River natural heritage.



Sally Gutzke

Double Feature

How Ann and Tommy Barber became one of the top teams in Georgia botany

By Margaret Shannon

This happened in Moultrie, in deep south Georgia. A police cruiser pulled to a stop alongside a railroad where a man lay prone on the ground, a drunk, perhaps, or a victim of foul play who'd been reported, possibly, by a good, but cautious Samaritan. The officer took one look and didn't even get out of the car. He spoke resignedly into his police radio. "It's just Thomas Barber," he said, "laying here making photographs of wild flowers."

Tommy Barber and his wife, Ann, have done whatever it takes to shoot wild flowers. They have spent more time in ditches than many ditchdiggers. "We were very much part of the wet-belly school of flower photography," Tommy said. "I've always thought that the way to make the best flower picture was to look up at the flower and back-light it." They have an admitted 20,000 color slides (and probably thousands more). Some are scenic, some show people, but mainly they're wild flowers.

The Barbers even set out while still rank amateurs to land some of their pictures in the prestigious *Wild Flowers of the United States: The Southeastern States*, which was soon to be published by the New York Botanical Garden. They made it

with three: *Asclepias connivens*, a greenish-yellow milkweed; *Rhexia lutea*, the yellow meadow-beauty; and *Balduina uniflora*, of the aster family. The credits list Leo T. Barber Jr., but it was actually a joint effort.

Just about everything the Barbers have done in botany and conservation has been a joint effort. Even their individual activities and accomplishments—and they are numerous—sprang, basically, from things they have done together. These endeavors spanned some 30 years of their 48-year marriage. All of this on top of raising four children, one of whom was lost to a brain tumor on the verge of young womanhood, and of being a part of the public, private, and business life of the wider Barber family of Moultrie, prominent in banking, construction, and politics.

Nearly everybody in botanical circles, however, connects Tommy and Ann Barber first of all with pitcher plants. Until it was acquired in 1994 by the state government, one of Georgia's most important habitats of *Sarracenia* and other species of carnivorous plants belonged to the Barber family—a tract of almost 700 acres between Sigsbee and Doerun



Ann and Tommy Barber of Moultrie have spent three decades in wild flower photography and in causes to conserve Georgia's natural resources.

northwest of Moultrie. The Barbers called it "the Doerun farm," and for years they saw that the undergrowth was burned periodically and the property otherwise maintained to enhance the growth of the pitcher plant and other flora.

Tommy and Ann also photographed the area lovingly. "We virtually haunted the place for 20 years," Ann said. "We were there in all seasons. It is a botanical treasure." Biologist Charles Wharton wrote of it as "nature's flower garden." It has an abundance of species of wild flowers. Ann said one reason they spent so much time there was that they wanted to "prove south Georgia wild flowers were as good as the mountains'." The Barbers let many organizations and schools take groups on field trips to the pitcher plant bogs. Over the years, hundreds of Georgians enjoyed the

Doerun farm, but none more than Ann and Tommy.

When Leo T. Barber Jr. of Moultrie married Ann Lee of Dallas, Georgia, he had two cameras and she had one. He had taken up photography in high school and had been trained as a photo-lithographic supervisor in the Army. (He was on active duty in the Army Corps of Engineers in 1946-1947, serving in France and Germany, and was in the Active Reserve until 1972, exiting as a lieutenant colonel.)

Soon after returning from his active duty, Tommy began carrying a camera everywhere he went. There were scenic pictures, pictures of bridges being built by Barber construction crews, and in due time pictures of children. In one period, when Tommy was overseeing the dispatch of highway construction

crews from a staging site on the Ochlockonee River at Moultrie, he'd get there early and photograph flowers at the edge of adjacent woods.

"One day about 1964 we looked around and we had about 2,000 pictures of wild flowers that we didn't know what they were," Tommy said. Neither Ann, with a sociology degree from the University of North Carolina, nor Tommy, with a civil engineering degree from Georgia Tech, had studied botany. Ann plunged deeply into the identification task.

"I went to the library and got a copy of *Flowers of the South* by Greene and Blomquist," she said. "It had black-and-white sketches of native and cultivated flowers both.

That was my mainstay. I almost wore the library copy out.

"Then I got to Moldenke. We started collecting books. Then, you could buy every wild flower book you saw and you wouldn't feel overburdened with them." Now they have a large library of books on plants, including two volumes of an 1850 work on medicinal plants, once owned by an Episcopal bishop, a relative of Tommy's by marriage.

They got what amounted to their first crash course in botany when they undertook their most quixotic venture in wild flower photography—when, as Ann put it, "we decided we were going to knock ourselves out to sell some pictures to the New York Botanical Society" for its forthcoming *Wild Flowers in America*.

By the time they took on this presumptuous goal, the society had already obtained most of the pictures it needed and the ones left were the hard ones to find and photograph. Ann got a list and started poring over J. K. Small's *Manual of the Southeastern Flora*, only to realize that there had been extensive changes in nomenclature since its publication in 1933. Tediously she tracked down the differences and made copious notes on where the



***Sarracenia flava*,**
trumpet pitcher plant

wanted species grew and when they flowered.

Tommy and Ann spent six months on the undertaking, which ended in their selling those three of Tommy's pictures to the New York Botanical Society for \$25 per picture. It was a

To a Pitcher Plant

By Sarah Anne Staples

Exotic trap

With silent "snap"

Your dinner comes to you!

What the habitat lacks

You get in your snacks

With enzymatic goo!

triumph, sort of, and they had a lot of fun. By the time ten Barber photographs appeared in the Duncan-Foote *Wildflowers of the Southeastern United States*, published in 1975, his work was well-known. The ten chosen for Duncan-Foote are: *Eichhornia crassipes*, water hyacinth; *Zigadenus densus*, crow poison; *Polygonatum biflorum*, Solomon's seal; *Clematis reticulata*, leather vine; *Drosera leucantha*, sundew; *Tephrosia hispidula*, goat's rue; *Erythrina herbacea*, coral bean; *Stillingia sylvatica*, queen's delight; *Physostegia virginiana*, false dragonhead; and *Pinguicula caerulea*, violet butterwort.

The Barbers have a long friendship with Wilbur Duncan, the retired University of Georgia botanist, one of the greats in his field, and his wife, Marion, dating from a rainy-day wild

flower workshop at Callaway Gardens in 1964 when Tommy and Ann rode from site to site with Duncan. From time to time when Ann was altogether stumped on an identification, she would send off a specimen to Duncan at the University of Georgia in Athens and back would come the information in short order. "One of my proudest moments," said Tommy "was when we had a continuous slide show running at a Georgia Conservancy annual conference and Wilbur sat through the whole thing."

Ann later benefited from the expertise of another of the state's premier botanists, Wayne Faircloth of Valdosta State College, also now retired. Ann served for seven years as a judge in a roadside wild flower program sponsored by the Georgia Department of Transportation and the Garden Club of Georgia. Faircloth was a fellow judge, and the panel traveled the state annually to choose winners of the competition among highway maintenance supervisors for the best roadside plantings. She learned along the way, adding to her increasingly excellent knowledge of botany.

After reading about the Georgia Botanical Society's 40th anniversary celebration in 1966, Ann and Tommy joined. This proved to be the start of another phase of their botanically inspired interests: participation in the structured milieu of organizations, agencies, and projects.

At a Bot Soc meeting in Atlanta, Tommy heard Mary Izard give a pitch for the new Georgia Conservancy, one of the spate of advocacy organizations springing up in the glow of the golden age of the

environmental movement in the late 1960s. He was soon on its board of trustees and eventually served as chairman in 1979-1981. He was getting serious about conservation.

In 1971, at the suggestion of Tommy's brother, then-Governor Jimmy Carter asked him to become a member of the board of the Georgia Game and Fish Commission. "I told him I wasn't interested unless he was going to merge Game and Fish, the parks, and so on into one department," Tommy said. Carter made no promise, but appointed Barber anyway and the Department of Natural Resources soon

became reality. Tommy was on the board in 1972-1978, serving as secretary in 1974-1977. He was on the Georgia Heritage, Trust Commission in 1972-1974.

Through the years, the Barbers' interest did not flag. They went to National Wildlife Federation workshops held at key locations around the country and taught by knowledgeable instructors. Ann, working with Carol Pickens, a teacher of gifted students in junior high school in Moultrie, developed a program of study of an unusual assortment of trees along a block and a half of Third Street, the street on which the Barbers live. Tommy and Ann led field trips and nature walks and put on slide shows. They traveled to Canada and abroad, looking, learning, photographing.

Until changing circumstances intervened, the Barbers gave their bushels of color slides little rest. When they began compiling slide shows, they chose the slides jointly, sometimes spiritedly. Ann wrote the scripts. Tommy handled the logistics. Fit into other activities, some shows took as long as a year to complete. They have a dozen or so on the shelves, ready for use, already shown many times to many groups.

An addition to their house was necessary to provide space for working on and storing their slides, slide shows, prints, notebooks, and other files and materials. Much of the data is now on computer. There are computers in three rooms upstairs, including their bedroom. Files spill over into a downtown office. "Tommy never throws anything away," Ann said. "He tells me not to, either."

Calopogon, grass-pink



Leo T. Barber Jr.

Ann and Tommy Barber did not deliberately give up botany. One thing after another came along to pull them away. In October 1992, Ann fell in Washington, D. C., and ended up with a partly artificial hip and a long period of rehabilitation. When he could have been thinking of retirement, Tommy was obliged to take on heavier responsibilities in the family businesses. At 73, he finds himself chairman of the Southwest Georgia Bank, president of an investment company, and general partner of a finance company. The Barber family's construction interests were sold some years ago. He also had to deal in recent years with eye and other health problems.

Unable to keep up the exacting work of wild flower photography because of his eye trouble, Tommy has turned to family history and his methodology is as exhaustive as ever. There have been other developments requiring time away from botany. Things just piled up.

Walk into the Barbers' living room, however, and two walls partly covered by wild flower prints bring beauty and joy. As one set of prints fades, another



Hypoxis, *stargrass*

Pinguicula, *butterwort*



Leo T. Barber Jr.

Leo T. Barber Jr.

replaces it. Come Christmas, the Barbers' greeting card will show no Santa Claus, but a print of a bright, cheerful wild flower selected from those 20,000 color slides by a process as intricate as the choice of Miss America. Children include a doctor son, a daughter hydrogeologist, an M.B.A. son. And there are grandchildren.

And memories. Like getting, at last, a photo of the purple bladderwort, *Utricularia purpurea*. They rushed once to the Okefenokee to get it, only to mess up a whole roll

of film. Success came in a pond between Moultrie and Tallahassee.

Then there's always the frog story to equal Mark Twain's. At the Doerun farm one day, they came upon a tiny tree frog ensconced in a pitcher plant. Was it trapped or was it feasting on trapped insects? To see better and to photograph the sight, Tommy made a small slit in the plant, then another, shooting between each cut. Another slit—and that frog was outta there, startling Ann and Tommy and leaving them laughing to this day.

In Their Own Words


The Barbers send out a Christmas letter to friends, and there is usually some botanical news in it. Some excerpts:

(1964) "We had always been interested in photography and when the children got old enough to rebel at posing for us, we briefly considered trying bird photography. But they proved even more difficult than the children. Then we discovered flowers! They aren't perfect; they will sway in the wind and will wilt if not handled carefully. But they don't complain and they don't fly away and we have enjoyed learning more about them. It has opened up a whole new world which I had always overlooked and makes even the roadsides on any ordinary trip a thing of interest. Come to see us—and we will show you a thousand or so color slides."

(1965) "In March Tommy and I went down to the Highlands Hammock State Park near Sebring (Florida) in pursuit of wild flowers to photograph. You should see us sometime when we set out on one of these expeditions, draped all over with cameras, light meters, flash

equipment, and even (stretch your imagination now!) a white umbrella to reflect the light into the flower. Sometimes we add to these basics a large square of cardboard for background and a sling blade to hack our way through the bush and defend ourselves against snakes. (We have seen one in all our wanderings in the woods)."

(1970) "We have had some interesting guests. One was a surgeon from Cleveland who flew down to investigate the possibilities of 'milking' sundews (a small carnivorous plant with sticky fluid on the leaves) and experimenting with the fluid for medical purposes. Unfortunately, the substance was too volatile to collect in large enough quantities, but he was a charming man with interests in half a dozen areas, and we had a delightful day showing him the bog and exchanging information on carnivorous plants. Another time, Dr. Bell, of the North Carolina Botanical Garden, came by with four graduate students, and these budding botanists fell upon the bog like children on a plate of goodies."



*Fiddlehead of
the rosy
maidenhair*

Name Changes for Georgia Ferns

*The experts just won't
let the Latin be*

*By Lloyd Snyder
and David Emory*

People who use scientific names for plants ("serious" botanists) like to think that these names have several advantages over common names. They claim that scientific names are not confusing and misleading, that they show real relationships, that they are understood by botanists around the world in all languages, that they do not vary from one region to another, and that they have a degree of permanence.

Who knows, after all, what a "bluebell" is? Is it one of the several species of *Campanula*, or is it *Mertensia virginica*? A rose by any other name may smell as sweet, but is it *Rosa multiflora* or *carolina* or *micrantha* or one of the myriad other roses?

Does this mean, then, that common names of plants can't be relied on and that botanical names are as stable as the Rock of Gibraltar? Not necessarily. Botanical names do change, and possibly the greatest flood of changes in the centuries-old

history of botanical nomenclature is on its way with the publication of the *Flora of North America*.

In 1993, the first two of 14 planned volumes were published. The first contains introductory essays. The second is *Pteridophytes and Gymnosperms*, and its effect on existing literature in that category of plants is profound. In Georgia, for instance, it affects 34 of the species listed in Lloyd H. Snyder Jr. and James G. Bruce, *Field Guide to the Ferns and other Pteridophytes of Georgia*, published in 1986.

Volume 2 of *Flora of North America* contains 34 name changes of species as listed in Snyder and Bruce. These include 19 species placed in other genera, five changed to new names in the same genus, 13 in which a subspecies or varietal designation has been either added or removed, and two species which have been given new identifications. Five species come under two changes.

Many people, the authors included, will find it a nuisance to learn these

new names, but taxonomists do have their reasons. And, after all, we do manage to learn names of new species when necessary. For example, in addition to the above species whose names have been changed or which have just been correctly identified, there are four more species that have only recently been found in Georgia:

Adiantum hispidulum, rosy maidenhair fern. Escapes sometimes from cultivation and has been found in south Georgia as well as in some other states.

Polypodium appalachianum, Appalachian polypody. First described in 1991, and differs from the rockcap fern (*Polypodium virginianum*) primarily in chromosome number. These two species, as well as their hybrid, are difficult to separate.

Vittaria appalachiana, Appalachian shoestring fern. Known only as a gametophyte, the nearly microscopic sexual generation. This fern does not reproduce by spores like most ferns. It was described in 1991 and has been found in twelve eastern states.

Trichomanes intracatum, Appalachian trichomanes. Another fern known only in the gametophyte stage. It was described in 1992 and has been found in 19 eastern states.

The changing of the classification of plants to reflect more accurately, current understanding the discovery and naming of plants new to science, and the incorporation into regional treatments of plants new to that area make taxonomy not the stable, dependable science many would like. But these changes are necessary if the science of taxonomy is to reflect the

realities of the field and laboratory.

The changes in Georgia fern names are summarized in the accompanying chart, arranged according to the page number in the *Field Guide*, and listing the names used in both the *Field Guide* and the *Flora*. The number in the right-hand column ("Reason") corresponds with the following numbered explanations for the changes:

1. The splitting of the very large genus *Lycopodium* into several smaller genera accounts for these name changes. It has been clear for some time that the 350-400 species fall into several well-defined groups. For example, two species in Georgia lack the distinctive strobili, or cones, in which the spores are borne in all other Georgia clubmosses. These two species have accordingly been placed in the genus *Huperzia*, and the other species have similarly been placed in several well-defined genera. *Huperzia* was described as a genus as long ago as 1801, and the other four new genera of clubmosses in Georgia were described between 1964 and 1983.
2. Restudy of *Lycopodium* (*Huperzia*) *selago* indicates that it is not found south of Ohio, New York, and Connecticut, and, therefore, what is found in northeast Georgia is actually the recently (1992) described *Huperzia appalachiana*.
3. Also, it has recently been determined that *Diplazium japonicum*, thought to have been found several times in Georgia, was misidentified and is actually *Deparia petersenii*.



Adiantum hispidulum, *rosy maidenhair*,
has recently been found in Georgia

4. A number of species in the large genus *Athyrium* have been transferred to the related genus *Deparia*, because they have multicellular hairs on their blades. Thus the silver glade fern is now *Deparia acrostichoides*.

5. Likewise, several other species are removed from *Athyrium* because their sori are straight rather than hooked. Glade fern is now *Diplazium pycnocarpon*.
6. Because their leaves are more divided (two or more times),

several species of the large genus *Thelypteris* have been segregated as *Macrothelypteris*. The Mariana maiden fern is now *Macrothelypteris torresiana*.

7. Several species in the large genus *Polypodium* that have scaly leaves are thought to be more closely related to the old genus *Pleopeltis* and have recently been transferred to that genus. Therefore, the familiar resurrection fern has become *Pleopeltis polypodioides* var. *michauxiana*.
8. Because the walking fern hybridizes with five species of *Asplenium*, it is now classified as a member of that genus rather than of *Camptosorus* as was done in the past.
9. Certain species in the large genus *Cheilanthes* (or *Notholaena*) are characterized by distinctive star-like scales and have recently (1992) been segregated as a new genus, *Astrolepis*. Thus the disjunct wavy cloak fern, found at one site in Georgia, is now *Astrolepis sinuata* subsp. *sinuata*.
10. In 1992, the two *Isoetes* hybrids were given names as species as shown in the chart. This sort of name change happens when hybrids are found to be fertile rather than sterile. In both of these cases, however, there are some questions regarding the hybrids' correct parentages.
11. Sometimes a third epithet (subspecies or variety) has been added to a binomial, indicating that the species has been divided into two or more subspecies or varieties. Based on the type

specimen, one of these kinds is determined to be the "typical" kind, while the others are "atypical." In the typical kind, the third part of the name will be identical to the second part, while atypical kinds will have a third word different from the second.

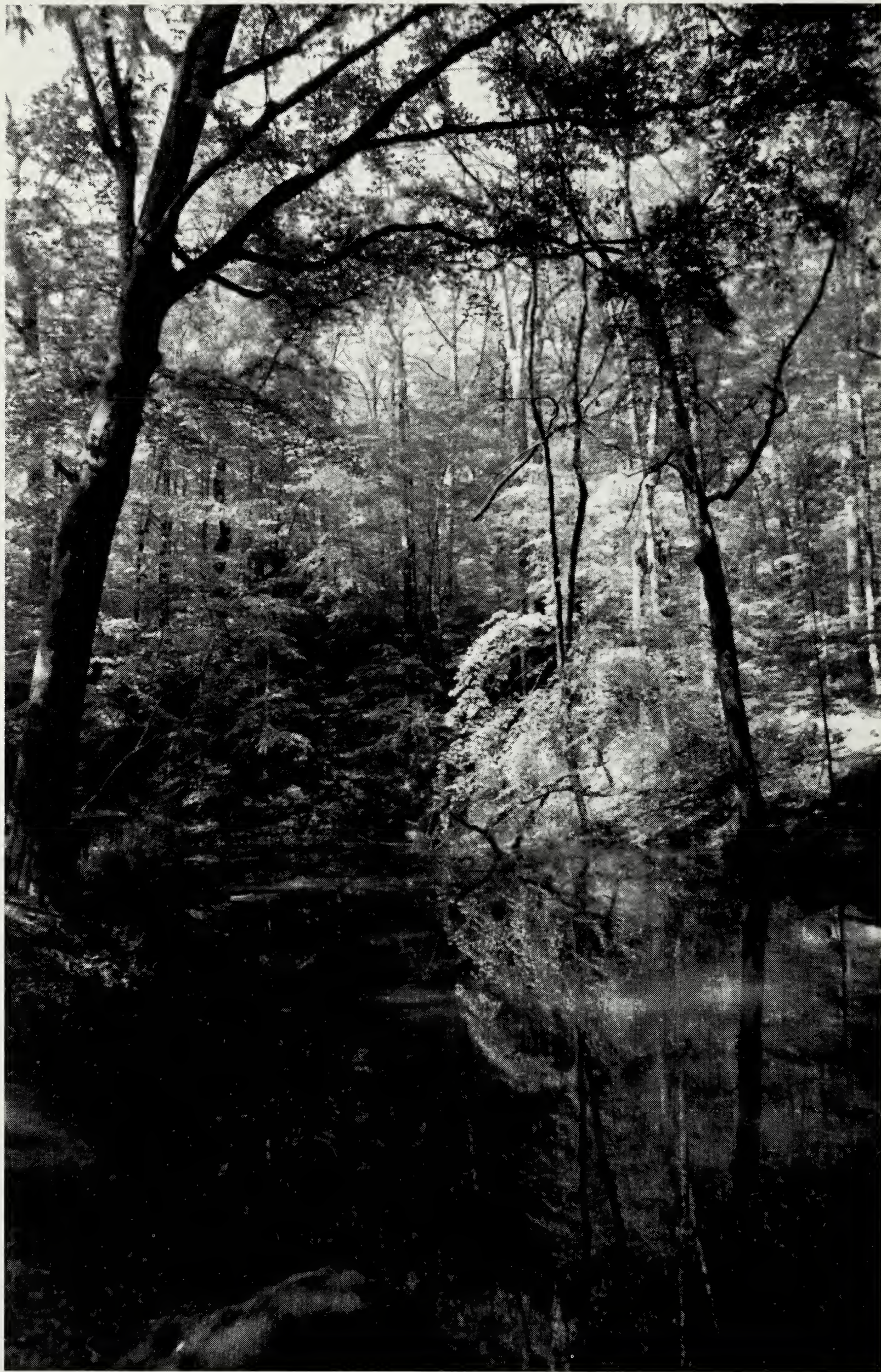
12. In one species, both kinds are found in Georgia. Riddell's spikemoss was reduced to a subspecies of sand spikemoss and became *Selaginella arenicola* subsp. *riddellii*, while the typical kind is now *Selaginella arenicola* subsp. *arenicola*.
13. In five Georgia ferns only the atypical kind is found in Georgia, and therefore there are names like *Osmunda regalis* var. *spectabilis*, indicating that there is a typical variety (*Osmunda regalis* var. *regalis*) found elsewhere.
14. The remaining name changes are simply the result of returning to names commonly used in the past. *Ophioglossum pycnostichum*, *Polypodium aureum*, *Lorinseria areolata*, *Thelypteris hexagonoptera*, and *Isoetes piedmontana* have all been changed to the names by which they had previously been known.



Barbara Orsich

Name Changes of Georgia Pteridophytes

Page	Field Guide	Flora	Reason
26	<i>Ophioglossum nudicaule</i> var. <i>tenerum</i>	<i>Ophioglossum nudicaule</i>	11
32	<i>Ophioglossum pycnostichum</i>	<i>Ophioglossum vulgatum</i>	14
38	<i>Osmunda regalis</i>	<i>Osmunda regalis</i> var. <i>spectabilis</i>	11, 13
42	<i>Polypodium polypodioides</i>	<i>Pleopeltis polypodioides</i> var. <i>michauxiana</i>	11, 13
44	<i>Polypodium aureum</i>	<i>Phlebodium aureum</i>	14
60	<i>Cheilanthes sinuata</i>	<i>Astrolepis sinuata</i> subsp. <i>sinuata</i>	9, 11
84	<i>Asplenium trichomanes</i>	<i>Asplenium trichomanes</i> subsp. <i>trichomanes</i>	11
106	<i>Camptosorus rhizophyllus</i>	<i>Asplenium rhizophyllum</i>	8
108	<i>Blechnum occidentale</i>	<i>Blechnum occidentale</i> var. <i>minor</i>	11, 13
112	<i>Lorinseria areolata</i>	<i>Woodwardia areolata</i>	14
116	<i>Athyrium thelypteroides</i>	<i>Deparia acrostichoides</i>	4
118	<i>Athyrium pycnocarpon</i>	<i>Diplazium pycnocarpon</i>	5
120	<i>Diplazium japonicum</i>	<i>Deparia petersenii</i>	3
128	<i>Woodsia obtusa</i>	<i>Woodsia obtusa</i> subsp. <i>obtusa</i>	11
130	<i>Woodsia scopulina</i>	<i>Woodsia scopulina</i> subsp. <i>appalachiana</i>	11, 13
134	<i>Thelypteris torresiana</i>	<i>Macrothelypteris torresiana</i>	6
136	<i>Thelypteris hexagonoptera</i>	<i>Phegopteris hexagonoptera</i>	14
144	<i>Thelypteris ovata</i>	<i>Thelypteris ovata</i> var. <i>ovata</i>	11
146	<i>Thelypteris palustris</i>	<i>Thelypteris palustris</i> var. <i>pubescens</i>	11, 13
170	<i>Cyrtomium fortunei</i>	<i>Cyrtomium fortunei</i> var. <i>fortunei</i>	11
186	<i>Lycopodium lucidulum</i>	<i>Huperzia lucidula</i>	1
188	<i>Lycopodium selago</i>	<i>Huperzia appalachiana</i>	1, 2
190	<i>Lycopodium alopecuroides</i>	<i>Lycopodiella alopecuroides</i>	1
196	<i>Lycopodium prostratum</i>	<i>Lycopodiella prostrata</i>	1
200	<i>Lycopodium appressum</i>	<i>Lycopodiella appressa</i>	1
202	<i>Lycopodium carolinianum</i>	<i>Pseudolycopodiella caroliniana</i>	1
204	<i>Lycopodium cernuum</i>	<i>Palhinhaea cernua</i>	1
210	<i>Lycopodium tristachyum</i>	<i>Diphasiastrum tristachyum</i>	1
212	<i>Lycopodium digitatum</i>	<i>Diphasiastrum digitatum</i>	1
224	<i>Selaginella arenicola</i>	<i>Selaginella arenicola</i> subsp. <i>arenicola</i>	11, 12
228	<i>Selaginella riddellii</i>	<i>Selaginella arenicola</i> subsp. <i>riddellii</i>	11, 12
236	<i>Isoetes engelmannii</i> x <i>piedmontana</i>	<i>Isoetes georgiana</i>	10
	<i>Isoetes flaccida</i> x <i>piedmontana</i>	<i>Isoetes boomii</i>	10
248	<i>Isoetes piedmontana</i>	<i>Isoetes virginica</i>	14



This Enchanted Forest

It's magic all seasons at Fernbank

By David O. Funderburk

It is a Wednesday in mid-March in a year past. For three consecutive days I have walked in Fernbank Forest. Each day the experience was different. On Monday, a class of first grade students and I saw butterflies, earthworms, and numerous songbirds. A pileated woodpecker landed on a dead pine snag, not 30 feet away, and filled the forest with his raucous call. We watched tiny fish swimming in Huntemann Pond and looked for frog eggs. We talked about the end of winter and looked for signs of spring. They became expert beech tree spotters, recognizing the larger trees by the carvings in the bark and the smaller trees by the dead leaves still hanging on the branches.

On Tuesday, I changed winter to spring. Actually, I replaced all the winter trail guide signs with corresponding signs for spring, so that visitors will be able to identify the spring flowering plants. Hepatica,

bloodroot, spicebush, and little sweet Betsy, the purple trillium, are already blooming. The flowers of daffodils, planted around a caretaker's cottage many years ago, are almost gone. The flower buds of pawpaw, Elliott's blueberry, and redbud are just beginning to open. Wild geranium has not made its appearance, but I placed a sign where it will be blooming in a couple of weeks.

The temperature is much higher than it was on Monday. I was almost uncomfortably hot by the time I completed the trail loop. I sat on a bench, conveniently located halfway up the steepest part of the trail, and contemplated the wonders I had experienced in just one hour. I had seen the shadow of a red-tailed hawk on the forest floor as I placed a sign near the purple trilliums. I looked up to see this magnificent bird soaring and circling just above the forest canopy. Later it landed in a large white oak, posing for more than a

Huntemann Pond (left)

minute before it took to the air again and disappeared over a hill.

As I crossed the stream which flows through the forest, I saw several chubs dart from the shelter of an overhanging bank to the center of a

raccoon that one of the astronomers saw in a trash can the night before. All at once I noticed an out-of-place form clinging to a southern magnolia leaf. It was a red bat, and just above it, another one. I have been walking

**Trillium
cuneatum,
little sweet
Betsey**



sparkling pool of water. Then, almost quicker than the eye could follow, they returned to the protective cover of the bank. I got a glimpse of a slimy salamander as it disappeared under a large rock while I was searching for the rue-anemone that always blooms nearby in early spring. I caught my breath and continued walking to the top of the hill.

Today I was in the forest by 9 a.m. The temperature was about 45 degrees. There wasn't a cloud in the sky, the wind was blowing briskly, and spring seems to be right around the corner. In fact, spring *is* right around the corner, arriving in just four days at 3:28 p.m. on Sunday.

Blue jays, chickadees, titmice, and a couple of crows flew overhead. I subconsciously looked for the

in Fernbank Forest for over 30 years, but never before have I seen bats resting at eye level on a tree near the trail. Such is the beauty of natural areas. Regardless of how much time you spend in them, there is always something new to see and learn.

History

Before 1820, this forest was part of the Creek Indian Nation. In 1821, the Creek Nation ceded a large tract of land that contains the present-day Fernbank Forest to the state of Georgia. The tract was divided into five large counties, surveyed, and divided into districts and land lots. The forest lay in the northeast corner of land lot 243 and the northwest corner of land lot 244 in the fifteenth district of DeKalb County. Land lot

244 was deeded to James Crenshaw in 1824, and land lot 243 was deeded to Steven James in 1825. Records for 1825–1842 were destroyed when the DeKalb County courthouse burned. The land remained in a pristine state under the ownership of a succession of prominent Georgians. In 1889, Colonel Z. D. Harrison, clerk of the Supreme Court of Georgia, became the sole owner of 283 acres that included Fernbank Forest. All previous owners had been professional men who had lived in Atlanta or Decatur, or out-of-state, and had never built homes or farmed the land there. It was a virgin forest.

Colonel Harrison soon built a cottage on the property. He constructed a plank road from Little Five Points that roughly followed the present course of Euclid Avenue. Decatur lay over two miles to the east. Atlanta was three miles to the

west. Today, it is difficult to comprehend the inaccessibility of this land in 1889. By 1908, plans to develop Druid Hills were underway. In 1911, Colonel Harrison sold 44 acres for the construction of Druid Hills Golf Club.

Miss Emily Harrison, Colonel Harrison's daughter, persuaded him to enlarge the cottage. He built a three-story mansion out of stones gathered from his estate. It had walls nearly two feet thick, with 20 rooms, wide verandas, and a portico for carriages.

When Colonel Harrison died in 1935, Miss Emily was instrumental in getting her family members to agree to sell the property to Fernbank, Inc., hoping to insure that the forest would remain forever in its pristine condition. The land was purchased in 1939 for \$500 an acre, a total of \$35,000.



Bernard Thoeny

For several years the mansion housed a natural history museum, complete with dioramas, caged live animals, a library, and areas set aside for arts and crafts. Eventually the museum closed and the mansion was vandalized. Various groups, organized and unorganized, used and abused the forest through the mid-1960s.

In 1964, representatives of the DeKalb County Board of Education and Fernbank, Inc., signed a lease giving the board control and use of the forest for 48 years with a review every eight years. The lease gave the board the authority to develop nature trails and to build a science center on a four-acre tract fronting Heaton Park Drive. Construction began in 1966. The forest was fenced, and a one and one-half mile paved nature trail was developed. Fernbank Science Center opened to the public in December 1967.

Ecological Description

Fernbank Forest is a 65-acre suburban woodland located in the Piedmont Physiographical Province of Georgia. Elevation ranges from 1,030 feet at the public entrance to 900 feet at the service entrance on Clifton Road. A small stream, fed by springs within the forest and rain runoff, has been impounded to form a small pond. The stream exits the forest at Clifton Road, eventually flowing into Lullwater Creek, Peavine Creek, South Peachtree Creek, and the Chattahoochee River. Rainfall averages approximately 48 inches per year. The forest slopes gradually to the west, with some steep slopes facing north and east. Fernbank Forest supposedly got its name from the prolific growth of

ferns on these protected north- and east-facing slopes.

More than 25 tree species grow in Fernbank Forest. The heights of canopy trees range from 75 to 90 feet, with some individual pines, tulip poplars, and white oaks exceeding 135 feet. Many tulip poplars have diameters of over 3 feet, with the largest exceeding 4 feet. Some white oaks are over 225 years old. Pines (loblolly and shortleaf) range in age from 65 to more than 135 years. There are approximately 180 trees per acre with diameters of 4 inches or larger, averaging 12 inches in diameter. More than 11 per cent exceed 20 inches in diameter.

James N. Skeen (1974) did a comprehensive study of the composition and biomass of the tree species growing in Fernbank Forest. His study indicated that tulip poplar had the highest importance value, followed by white oak, hickory (several species), loblolly and shortleaf pine, beech, northern red oak, and flowering dogwood. He found that these seven groups accounted for 75 percent of the forest's aboveground weight. Black oak, black gum, basswood, southern red oak, sourwood, American hornbeam, winged elm, sweetgum, post oak, ash, and red maple are present in smaller numbers. Black cherry, umbrella magnolia, black walnut, water oak, redbud, and persimmon are represented by one or more trees.

Flowers of redbud and flowering dogwood delineate the understory level in spring. A distinct shrub level, marked by sweet shrub, spicebush, and Elliott's blueberry, grows below the understory trees. At ground level,

Finding Fernbank

Fernbank Science Center is located at 156 Heaton Park Drive, approximately three blocks from the intersection of Ponce de Leon Avenue and Scott Boulevard, near Decatur. The Science Center contains an exhibit hall, a planetarium, an observatory, and specialized classrooms and laboratories. The public entrance to Fernbank Forest is directly behind the Science Center.

Monday through Friday, the forest is used as a living laboratory for formal school programs from 9 a. m. to 2 p.m. The programs, taught by Science Center instructors, are available to all schools, but must be scheduled in advance.

The forest is open to the public from 2 p.m. to 5 p.m. Sunday through Friday and from 10 a.m. to 5 p.m. on Saturday. Visitors sign a register when they enter and exit the forest. A security guard gives each visitor a seasonal trail guide. Signs identify the trees, shrubs, herbs, and ferns along the trail.

Huntemann Pond provides an aquatic habitat where fish, frogs, turtles, and water snakes abound. The Harrison Overlook, built by Youth Conservation Corps participants in 1980, permits visitors to get a bird's-eye view of the canopy. An underground window permits visitors to get a worm's-eye view of the soil. Rock outcroppings, covered with lichens,

protrude through the forest floor.

From week to week and season to season, the forest landscape changes. Dogwood and redbud flowers provide a breathtaking display in early spring. The green leaves of more than 25 species of trees dominate in summer. In autumn the colorful leaves of the broadleaf deciduous trees put on a display equal to that of the spring flowers. Winter is the peaceful season. Muted grays and browns of dried leaves, decaying humus, and tree bark abound, accented by the greens of pines and southern magnolia. More than 35,000 visitors experience the changing beauty of Fernbank Forest annually.

bloodroot, hepatica, wild geranium, several species of trillium, may apple, wild ginger, pennywort, and more than 10 species of ferns appear in March and April. A colony of Oconee-bells (*Shortia galacifolia*), transplanted from Oconee County, South Carolina, in 1967, continues to thrive. Unfortunately, these native wild flowers must compete with introduced species such as wisteria, English ivy, and Japanese honeysuckle.

Like other old-growth forests, Fernbank is a complex ecosystem. Knowledge of its pieces is fairly complete; how they fit together is not. The study goes on. Every day the forest changes.

The enchantment is forever.

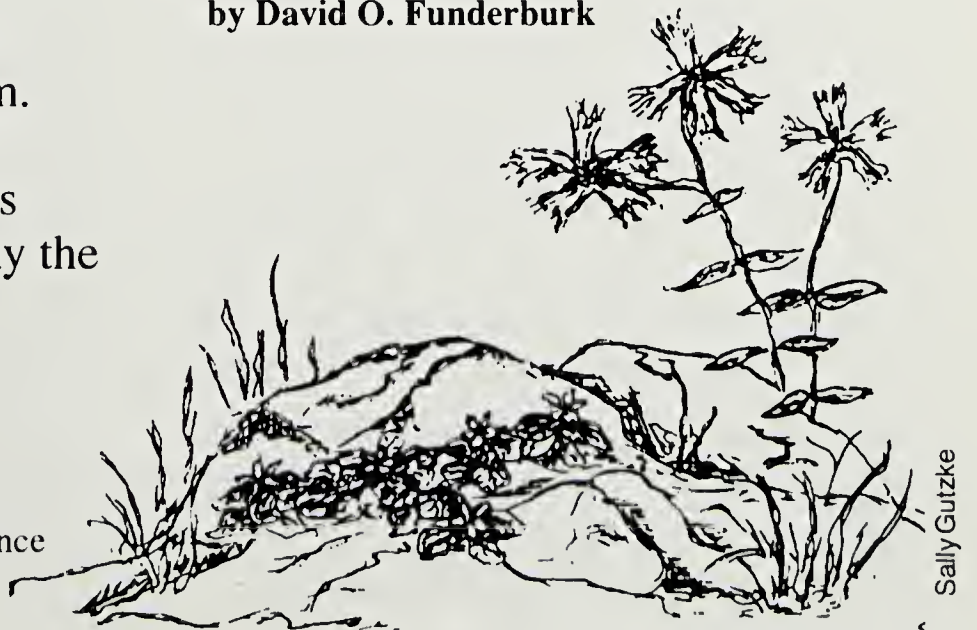
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by David O. Funderburk



ADDENDUM: Rainless in Seattle?

It rains a lot in Seattle, but now, with the arrival of Vivian Emerson, of "It Never Rained on Vivian" fame, things could change. This white-haired, sunny-dispositioned member of the Georgia Botanical Society has moved from Roswell, Georgia, to Seattle, Washington, to be close to family.

Vivian, who has been in Bot Soc since around 1966, worked on some of its biggest and toughest projects through the years. Her reputation as the sunshine girl of the organization dates back to 1971, when she was field trip chairman. She planned an outstanding array of trips to places like the (then) proposed parks along the Chattahoochee River, granite outcrops, Forsyth County, Hightowers, and the sandhills near Augusta. Her trips were blessed with a plethora of good weather. That's when the saying "It never rained on Vivian" began.

It was always fair weather, too, in the numerous reports of field trips and pilgrimages she wrote for the Bot Soc newsletter. She wrote glowing accounts, ignoring bad weather or disasters. I remember one trip, when Bot Soc was fighting the battle of Pine Log Mountain. A large group of us arrived at a smooth, huge granite outcrop and here came a large rattlesnake climbing over the rocks toward us. The snake took one look at us and promptly turned around to

retreat back the way it came. Vivian's write-up skipped the snake and concentrated on the botanical finds and the congenial company.

In 1970 and 1971, the Botanical Society took on the chore of doing a biological survey of the Chattahoochee National Forest. From this beginning, we decided to attempt an atlas of Georgia plants. Vivian was cochairperson of the Range Records and Vegetation Committee.

This began a long and very close association between Vivian and me in traveling together to list plants and in compiling all available data on the location of Georgia plants. As we were planning the range records, Vivian suggested that someone needed to go into every one of Georgia's 159 counties. An officer, who shall be nameless here, exclaimed, "That is absolutely impossible!" Naturally we set out to prove this wrong.

One of us would say, "We haven't been to Chattooga County," so we'd start out for Chattooga County. Our most memorable trips were to the center of Georgia. On one of them, we were parked along a back road when an old gentleman in a pick-up truck pulled up beside us.

"You gals in trouble?" he asked.

"No, we're looking for plants," one of us replied.

I guess he thought we were looking for marijuana, for he got very



Bill Close

testy. "Git back to the city where y'all belong and don't come back," he advised emphatically.

Without Vivian the range records would never have been compiled. She always supplied the transportation (her car was newer than mine) and the enthusiasm. We shared the fun of new botanical discoveries. She well deserves the dedication in *Atlas of the Vascular Plants of Georgia* (1984): "To Vivian Emerson for her dedication to the project and her help and companionship on jaunts to the far corners of Georgia."

Vivian cheerfully took on some of the Botanical Society's most tedious tasks—like serving on the nominating committee year after year. Other tasks were pure pleasure. Pigeon

Mountain is one of her favorite places, and she and her late husband, Lyman, led field trips there. She headed a project to plant native flora at Island Ford on the Chattahoochee. She was good at gently cadging plants from charmed cadgees.

It's Seattle's gain, but we miss her...

For we have walked on Scuffle Bluff and shared Enotah's grateful shade,

We have walked where trilliums talked in many a far-flung glade;

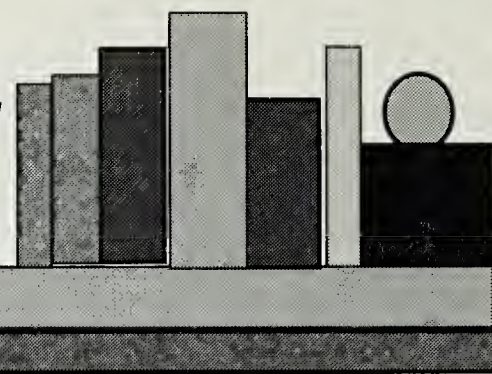
For we have gone a-wandering, in springtime and in fall,

And in the end remember the wonders of it all.

—Marie Mellinger



Bookshelf



Dictionary of Plant Names

By Allen J. Coombes. Timber Press. 1994.

The first thing that must be said about this book, which Timber Press labels as offering “botanical names and their common name equivalents,” is that it comes from Great Britain, where it was first published in 1985. This means that it is not oriented to American native plants—an understandable fact in view of its provenance, but something of a shortcoming, nevertheless. For instance, it lists nine species of *Silene*, but lists neither *Silene polypetala* (fringed campion) nor *Silene virginica* (fire pink).

Nor is it confined to native plants; it is heavily laced with cultivated ones. Coombes’s introduction makes this clearer than Timber Press’s blurb on the front cover. Its aim, the author writes, is to cover “the more commonly grown plants.”

These caveats aside, the *Dictionary* does have its own usefulness and not a little charm. It provides the phonetic pronunciation of the scientific names, a help to those of us who struggle constantly with the plethora of jawbreakers encountered in botany. Coombes, of course, often goes for “a” as in *ah* when Americans, even some scientists, might opt for “a” as in *ace*. And vice versa.

For the browsers, of whom this reviewer is one, one of the *Dictionary*’s more likeable features is the origin of scientific names of many of the plants. Marie Mellinger’s *Edgeworthia*, for

instance, honors Michael Pakenham Edgeworth (1812-1881), amateur botanist and collector with the East India Company. (Marie and friends found a puzzling population of *Edgeworthia papyifera*, the Japanese paper plant, in Rabun County, solved the puzzle, and instituted an annual trek to Wolf Creek to see it in flower.) *Sarracenia* derives from Michael Sarrasin (1659-1734), French botanist and physician. *Paulownia*, the princess tree, an escape of Chinese origin so common it’s no longer considered a cultivated plant in the United States, is actually named for a princess, Anna Paulowna (1795-1865), daughter of Czar Paul I of Russia.

Coombes often explains derivations from other factors also. *Coreopsis*, he says, comes from the Greek *koris*, for bug, and *opsis*, for resemblance, because the seeds look like ticks. *Hypericum* is from the Greek *hyper*, above, and *eikon*, a picture, because it was placed above pictures to ward off evil spirits. *Parthenocissus*, as in *P. quinquefolia*, Virginia creeper, derives from *parthenos*, meaning virgin, the *kissos*, ivy.

All information cited here is available from other sources, but perhaps not quite so handily or succinctly. The book is 207 pages, glossy hardback, 5.25 x 7.75 inches in size, and cleanly printed. After my initial irritations, I found I like it. —M.S.

From the Editor: A Mixed Bag

With this issue, *Tipularia* rounds out its first decade of publication. One thing I've always liked about it is its eclecticism, maybe because I had a hand in setting the policy. Anyway, this issue is a fair example of the desired mix of contributions from professionals who make their living in botany or related fields and from amateurs who just love nature gone native.

Jim Allison is the consummate professional, with the good luck to do for a living what he likes to do. Richard Ware, however, who writes a companion piece to Jim's prairie article, is the consummate amateur, diligent, devoted, and talented.

David Emory is certainly a professional. He holds the degrees and for part of his working life was a teacher of scientific subjects. Not so for Lloyd Snyder, his coauthor of the fern article. Lloyd is a bookseller who tackled ferns after retirement, and did so well that in a few years he knew enough to coauthor *Field Guide to the Ferns and Other Pteridophytes of Georgia* (1986).

Then there are Ann and Tommy Barber, the subjects of a profile in this issue. They were rank amateurs at the outset of their life in botany. They're still amateurs, but not rank anymore after three decades filled with satisfactions and accomplishments.

David Funderburk, Will Griffin, and Frances Kennedy, who have written for this issue, fall into the professional category. Then I come in to restore the balance, the most amateur of all the amateurs represented in this issue. In my previous incarnation as the first editor of *Tipularia* in the mid-1980s and now as its temporary (one issue) editor, I found and still find it hard to believe that I'm the honcho-in-chief of a *botanical* magazine, of all things.

Years ago, when I was a relatively young reporter on The Atlanta Journal, a colleague bought several acres overlooking the Chattahoochee River at Roswell. We'd go out there and picnic, pace off a site for her house, and rummage around in the outdoors. I saw my first blooming bloodroot there, and was instantly hooked on wild flowers. I have never brought to botany the devotion and skill that amateurs Lloyd, Ann, Tommy, and Richard do, but it has been a joy to tag along.

The point is that *Tipularia* is a mixed bag, just as the Georgia Botanical Society is a potpourri of people who love wild flowers and other native plants—or come along with their spouses or significant others when they'd really rather be home reading Gloria Steinem or watching the Braves. But, hey, it takes all kinds.

—Margaret Shannon

Continued from front cover

Lloyd Snyder, fern specialist *extraordinaire*, is also noted for his booming voice, which often has come in handy on field trips and at Bot Soc meetings. In his "Acknowledgments" in his 1986 field guide to Georgia ferns, Lloyd mentions his wife, Annice, as often accompanying him on his fern quests and calls David Emory "a welcome companion" numerous times.

Sarah Anne Staples teaches biology at Andrew College in Cuthbert, Georgia, and is an occasional poet. She has given programs on wild flowers and other native plants for many organizations. A special interest is use of plants in literature. One program is about Eudora Welty's use of plants in her short stories.

Bernard Thoeny of Marietta, a former Marine Corps sergeant, has been photographer at Fernbank Science Center for 15 years. He has an arts degree from the University of Alabama, has been awarded a grant by the National Endowment for the Arts, and has worked at the Anniston, Alabama, natural history museum. His father was interested in photography. Like father, like son.

Richard Ware Sr. of Rome goes botanizing many afternoons after work and most weekends. He has been studying trees for 25 years and wild flowers for about ten years, but there's still no danger of running out of species to find and photograph in northwest Georgia's Floyd County, his lifetime home.



Dyschoriste oblongifolia



Cirsium, *thistle*



Helianthemum, *rockrose*

**Photographs by Ann
and Tommy Barber**



Passiflora incarnata, *passion-flower*